Geophysical Research Abstracts,
Vol. 11, EGU2009-8538-1, 2009
EGU General Assembly 2009

The impact of midlatitude stationary waves on the Hadley cell and ENSO

R. Caballero (1) and B. T. Anderson (2)

(1) School of Mathematical Sciences, University College Dublin, Ireland (rodrigo.caballero@ucd.ie), (2) Department of Geography and Environment, Boston University, USA (brucea@bu.edu)

Stationary planetary waves are excited in the midlatitudes, propagate equatorward and are absorbed in the subtropics. The impact these waves have on the tropical climate has yet to be fully unraveled. One strand of research (Caballero 2007) has shown that interannual variability of stationary wave Reynolds stresses is well correlated with interannual variability in Hadley cell strength, a connection which can be physically understood by considering the zonal-mean momentum balance in the subtropics. A separate line of research (Vimont et al. 2003, Anderson 2004) has shown that changes in midlatitude planetary waves local to the Pacific strongly affect ENSO variability. Here, we show that the two phenomena are in fact closely connected. Interannual variability of wave activity flux convergence in the subtropical Pacific strongly affects the local Hadley cell, including subtropical subsidence and surface wind stresses, which in turn can initiate the onset of ENSO events. As a result, a winter with an anomalously strong Hadley cell tends to be followed a year later by an El Niño event.